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Supplementary Material

Article title: The social determinants of suicide: an umbrella review

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Table S1

PubMed search strategy and results

Search number (Concept)	Query	Results
#1 (Suicide)	Suicide [MeSH Terms] OR Suicid* [Title/Abstract]	117,837
#2 (Access to affordable health services of decent quality)	"Health care facilities, manpower, and services"[MeSH Terms] OR Healthcare* [Title/Abstract] OR "Health Services Accessibility" [MeSH Terms] OR "Health Services Accessibility"[Title/Abstract] OR "Universal Health Care"[MeSH Terms] OR "Universal Health Care"[Title/Abstract] OR "Right to Health"[MeSH Terms] OR "Right to Health"[Title/Abstract] OR "Healthcare Disparities"[MeSH Terms] OR "Healthcare Disparit*" [Title/Abstract] OR "Delivery of Health Care"[MeSH Terms] OR "Delivery of Health Care"[Title/Abstract] OR "Community Health Services"[MeSH Terms] OR "Community Health Services"[Title/Abstract] OR "Health Equit*" [Title/Abstract] OR "Emergency Healthcare"[Title/Abstract]	4,181,253
#3 (Education)	Education [MeSH Terms] OR Educat* [Title/Abstract] OR "Educational status"[MeSH Terms] OR "Educational status"[Title/Abstract] OR "Literacy"[MeSH Terms] OR "Literacy"[Title/Abstract] OR "Educational level"[Title/Abstract] OR "Educational achievement*" [Title/Abstract] OR "Academic performance"[Title/Abstract] OR "Academic success"[Title/Abstract]	1,468,653
#4 (Income and social protection)	Income [MeSH Terms] OR Income [Title/Abstract] OR Poverty [MeSH Terms] OR Poverty [Title/Abstract] OR Earning* [Title/Abstract] OR Wage* [Title/Abstract] OR "Income level*" [Title/Abstract] OR "Economic Status"[MeSH Terms] OR "Economic status"[Title/Abstract] OR "Socioeconomic Factors"[MeSH Terms] OR "Socioeconomic Factors"[Title/Abstract] OR "Economic Inequalit*" [Title/Abstract] OR "Economic Security"[Title/Abstract] OR "Social Class"[MeSH Terms] OR "Social Class"[Title/Abstract]	677,382
#5 (Early childhood development)	"Child Development"[MeSH Terms] OR "Child Development" [Title/Abstract] OR Child [MeSH Terms] OR Child* [Title/Abstract] OR "Language Development"[MeSH Terms] OR "Language Development"[Title/Abstract] OR "Adverse Childhood Experiences" [MeSH Terms] OR "Adverse Childhood Experience*" [Title/Abstract] OR "Adverse Childhood Event*" [Title/Abstract] OR "Early Childhood Development"[Title/Abstract]	2,781,944
#6 (Food insecurity)	"Food Insecurity"[MeSH Terms] OR "food insecurit*" [Title/Abstract] OR "Food Security"[MeSH Terms] OR "Food Security"[Title/Abstract] OR "healthy food*" [Title/Abstract] OR "Food deprivation"[Title/Abstract] OR "Food poverty"[Title/Abstract] OR "Nutritional deficiency"[Title/Abstract] OR "eating behavi*" [Title/Abstract] OR "Food intake"[Title/Abstract] OR "Hunger"[Title/Abstract]	106,248
#7 (Structural conflict)	"Social Structure"[MeSH Terms] OR "Structural Conflict"[Title/Abstract] OR "Social Structure"[Title/Abstract] OR "Social protection"[All Fields] OR "Social gradient"[Title/Abstract] OR "Policy"[Title/Abstract] OR "Social Policy"[Title/Abstract]	284,038
#8 (Social inclusion and non-discrimination)	"Social Inclusion"[MeSH Terms] OR "Social Inclusion"[Title/Abstract] OR "Sociological Factors"[MeSH Terms] OR "Sociological Factors"[Title/Abstract] OR "Social Behavior"[MeSH Terms] OR "social behavi*" [Title/Abstract] OR "Lifestyle"[Title/Abstract] OR "social attitude*" [Title/Abstract] OR "Social Deprivation"[MeSH Terms] OR "Social Deprivation"[Title/Abstract] OR "Social Participation"[MeSH Terms] OR "Social Participation"[Title/Abstract] OR "Social Discrimination"[MeSH Terms] OR "Social Discrimination"[Title/Abstract] OR "Discrimination"[Title/Abstract] OR "Social cohesion"[Title/Abstract] OR "interpersonal	1,299,700

	relations*[Title/Abstract] OR "Social Norms"[MeSH Terms] OR "Social Norms"[Title/Abstract] OR "Prejudice"[MeSH Terms] OR "Prejudice"[Title/Abstract] OR "Racism"[MeSH Terms] OR "Racism"[Title/Abstract] OR "Equality"[Title/Abstract] OR "Social status"[Title/Abstract] OR "social environment*[Title/Abstract]	
#9 (Unemployment and job security)	"Employment"[MeSH Terms] OR "Employment"[Title/Abstract] OR "Unemployment"[MeSH Terms] OR "Unemployment"[Title/Abstract] OR "employment, supported"[MeSH Terms] OR "Employment status"[Title/Abstract] OR "job loss*[Title/Abstract] OR "Job security"[Title/Abstract] OR "Joblessness"[Title/Abstract] OR "Redundancy"[Title/Abstract] OR "Working status"[Title/Abstract] OR "Employment situation"[Title/Abstract]	187,810
#10 (Working life conditions)	"Occupational Health"[MeSH Terms] OR "Occupational Health"[Title/Abstract] OR "Occupational Safety"[Title/Abstract] OR "Teleworking"[MeSH Terms] OR "Teleworking"[Title/Abstract] OR "remote work*[Title/Abstract] OR "Workplace Flexibility"[Title/Abstract] OR "Occupational Exposure"[MeSH Terms] OR "Occupational Exposure"[Title/Abstract] OR "Workplace"[MeSH Terms] OR "Workplace"[Title/Abstract] OR "Occupational stress"[MeSH Terms] OR "Occupational stress"[Title/Abstract] OR "workload"[MeSH Terms] OR "workload*[Title/Abstract] OR "Work Load"[Title/Abstract] OR "Working Conditions"[MeSH Terms] OR "working condition*[Title/Abstract] OR "burnout, professional"[MeSH Terms] OR "Burnout"[Title/Abstract] OR "Job Enrichment"[Title/Abstract] OR "employee wel*[Title/Abstract] OR "Job Demands"[Title/Abstract] OR "Organizational Climate"[Title/Abstract] OR "Quality of Work Life"[Title/Abstract] OR "work related illness*[Title/Abstract] OR "Work-Life Balance"[Title/Abstract] OR "Work Environment"[Title/Abstract]	269,529
#11 (Housing, basic amenities and the environment)	"Ill-Housed Persons"[MeSH Terms] OR Homeless* [Title/Abstract] OR Housing [MeSH Terms] OR Housing [Title/Abstract] OR "Medically Underserved Area" [MeSH Terms] OR "Medically Underserved Area" [Title/Abstract] OR "Neighborhood Characteristics" [MeSH Terms] OR "Neighborhood Characteristics" [Title/Abstract] OR "Neighbourhood Characteristics" [Title/Abstract] OR Sanitation [MeSH Terms] OR Sanitation [Title/Abstract] OR Environment [MeSH Terms] OR Environment* [Title/Abstract]	2,779,620
#12	#2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11	101,705,49
#13	"Systematic review*" [Title/Abstract] OR "Meta analy*" [Title/Abstract]	456,153
#14	#1 AND #12 AND #13	1,744

Table S2

Studies in which outcomes for suicide mortality could not be separated for overall results.

Author, Year	Title	Social Determinant
Ati <i>et al.</i> , 2021	What are the risk factors and protective factors of suicidal behavior in adolescents? A systematic review	Early childhood development
Carrasco-Barrios <i>et al.</i> , 2020	Determinants of suicidality in the European general population: A systematic review and meta-analysis	Early childhood development, social inclusion and non-discrimination, unemployment and job insecurity
Gariépy <i>et al.</i> , 2021	The mental health of young people who are not in education, employment, or training: A systematic review and meta-analysis	Education, unemployment and job insecurity
Gelvez-Gafaro <i>et al.</i> , 2022	Psychosocial risk factors associated with suicide in youth and adolescents: A systematic review	Early childhood development
Hu <i>et al.</i> , 2023	Effects of social support on suicide-related behaviors in patients with severe mental illness: A systematic review and meta-analysis	Social inclusion and non-discrimination
Hua <i>et al.</i> , 2019	A systematic review on the relationship between childhood exposure to external cause parental death, including suicide, on subsequent suicidal behaviour	Early childhood development
Kim and Leventhal, 2013	Bullying and suicide	Early childhood development
Kim <i>et al.</i> , 2012	Differences in incidence of injury between rural and urban children in Canada and the USA: a systematic review.	Housing, basic amenities and the environment, early childhood development
Lai <i>et al.</i> , 2017	Factors Influencing Suicide Behaviours in Immigrant and Ethno-Cultural Minority Groups: A Systematic Review	Social inclusion and non-discrimination
Lee <i>et al.</i> , 2023	Meta-Analysis of Acculturation and Suicide-Related Outcomes: A Test of the Immigrant Paradox	Social inclusion and non-discrimination
Liu <i>et al.</i> , 2021	Is there an association between hot weather and poor mental health outcomes? A systematic review and meta-analysis	Housing basic amenities and the environment
Mohatt <i>et al.</i> , 2021	A Systematic Review of Factors Impacting Suicide Risk Among Rural Adults in the United States	Housing, basic amenities and the environment
Moore <i>et al.</i> , 2022	Investigating the relationship between bullying involvement and self-harmful thoughts and behaviour in young people: A systematic review	Early childhood development
Ragguett <i>et al.</i> , 2017	Air pollution, aeroallergens and suicidality: a review of the effects of air pollution and aeroallergens on suicidal behavior and an exploration of possible mechanisms	Housing, basic amenities and the environment
Reed <i>et al.</i> , 2021	Suicide, Race, and Social Work: A Systematic Review of Protective Factors among African Americans	Social inclusion and non-discrimination
Todeshkchuei <i>et al.</i> , 2018	Psychosocial Factors Associated with Suicidal Behavior among Iranian Women: A Meta-analysis	Education, housing basic amenities and the environment
Valente <i>et al.</i> , 2023	Psychosocial Factors Associated with Suicidal Ideation and Behaviour: A Systematic Review	Income and social protection, early childhood development and social isolation and non-discrimination
Vásquez-Vera <i>et al.</i> , 2017	The threat of home eviction and its effects on health through the equity lens: A systematic review	Housing, basic amenities and the environment, Income and social protection
Williamson <i>et al.</i> , 2018	Occupational moral injury and mental health: Systematic review and meta-analysis	Working life conditions
Wu <i>et al.</i> , 2023	Suicide and suicidality in people exposed to pesticides: A systematic review and meta-analysis	Housing basic amenities and the environment
Yildiz, 2018	Suicide in sexual minority populations: A systematic review of evidence-based studies	Social inclusion and non-discrimination
Zanchi <i>et al.</i> , 2023	Could pesticide exposure be implicated in the high incidence rates of depression, anxiety and suicide in farmers? A systematic review	Housing, basic amenities and the environment

Table S3

Data Extraction Template

Title of Systematic Review	
URL to paper	
Author, year of publication	
Aim of review	
Type of review	
Inclusion/exclusion criteria	
Social determinant(s) examined, and definition(s) used	
Number of included studies	
Types of included studies	
Year range of included studies	
Appraisal tool used / operationalised	
Countries	
Study settings	
Populations of interest	
Age range	
Gender	
Measurement tools used (if applicable)	
Total sample size (or study specific sample sizes for meta analysis)	
Findings (for each SD):	
Total number of events	
Descriptive conclusions	
Effect estimates with 95% CI	
Qualitative findings	
Stratification of evidence	
Risk of bias/quality assessment	

Appendix S1

AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both

1. Did the research questions and inclusion criteria for the review include the components of PICO?		
For Yes:	Optional (recommended)	
☐ Population	☐ Timeframe for follow-up	☐ Yes
☐ Intervention		☐ No
☐ Comparator group		
☐ Outcome		
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?		
For Partial Yes: The authors state that they had a written protocol or guide that included ALL the following:	For Yes: As for partial yes, plus the protocol should be registered and should also have specified:	
☐ review question(s)	☐ a meta-analysis/synthesis plan, if appropriate, <i>and</i>	☐ Yes
☐ a search strategy	☐ a plan for investigating causes of heterogeneity	☐ Partial Yes
☐ inclusion/exclusion criteria	☐ justification for any deviations from the protocol	☐ No
☐ a risk of bias assessment		
3. Did the review authors explain their selection of the study designs for inclusion in the review?		
For Yes, the review should satisfy ONE of the following:		
☐ Explanation for including only RCTs		☐ Yes
☐ OR Explanation for including only NRSI		☐ No
☐ OR Explanation for including both RCTs and NRSI		
4. Did the review authors use a comprehensive literature search strategy?		
For Partial Yes (all the following):	For Yes, should also have (all the following):	
☐ searched at least 2 databases (relevant to research question)	☐ searched the reference lists / bibliographies of included studies	☐ Yes
☐ provided key word and/or search strategy	☐ searched trial/study registries	☐ Partial Yes
☐ justified publication restrictions (e.g. language)	☐ included/consulted content experts in the field	☐ No
	☐ where relevant, searched for grey literature	
	☐ conducted search within 24 months of completion of the review	
5. Did the review authors perform study selection in duplicate?		
For Yes, either ONE of the following:		
☐ at least two reviewers independently agreed on selection of eligible studies and achieved consensus on which studies to include		☐ Yes
☐ OR two reviewers selected a sample of eligible studies and achieved good agreement (at least 80 percent), with the remainder selected by one reviewer.		☐ No

Accepted version